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the topography of the country, and the important distinctions in climate which result therefrom; then, passing to the climatic factors, he describes in detail the temperature, rainfall, humidity, cloudiness, pressure, and winds as they exist in the different sections, and illustrates principally from the publications of Schott, Woeikoff, Blodgett, Loomis, Coffin, Dall, Gannett, Whitney, and the signal-service. Not content with general characteristics, he further specifies peculiarities, such as the suddenness of temperature changes in certain localities, tornadoes, northers, and Indian summer, with appropriate quotations from various writers; and he also appends special descriptions of the climate of Illinois, Lake Superior, the Mississippi valley, Canada, Manitoba, Hudson's Bay, Alaska, the plateau region, Colorado, California, Arizona, and the Bermudas. The climate conditions of other countries are treated with similar thoroughness, making the whole valuable for reference, while its chief merit lies in the running descriptions and summaries. A defect in the work is the lack of charts illustrating the various data. A few only are given; the main reliance for illustration being in the statistical tables, which are almost unnecessarily abundant. Graphic representations are always specially valuable to the reader, and their addition to the work would be a real improvement. It would also have been well to mention the analytical method of representing data, as well as the statistical and graphical; for, while its use is limited, it will surely grow in favor with the advance of the science.

The work of Dr. Hann represents the latest investigations, and is brought down almost to the very date of publication. It will therefore not be soon superseded; and, while additional data will accumulate in coming years, the general discussions will require but little alteration. The work is recommended for the general reader, not to be read in course, but by proper

selection. The general chapters and the summaries contain a large amount of information, for which the details and illustrations can be obtained from the accompanying pages. The student will find the work useful in calling attention to the authorities in each subject. Especially in the section on general climatology, where such topics as solar radiation and atmospheric absorption are, from the design of the work, treated in a general way only, will be found quotations from the publications of the latest investigators. It would be well, too, if the treatment of the subject of climatic factors should call attention to the need of publishing statistics in such a way as to be useful for reference. In this country particularly, we need to give consideration to this subject. There is scarcely an allusion made in the work under review to recent meteorological work in the United States, not because it has not been published, but because it has not been issued in a suitable form. In order to compare our statistics with those of other countries, it is necessary first to re-arrange and classify them. The international meteorological committee has recommended forms of publication, the adoption of which will add greatly to the facility with which corresponding data can be compared. But even these forms do not give all the data which the climatologist would like to have; and meteorological observations could be made more available for studies in climate by attention to the author's treatment of the subject. There is also need of deducing more results from the immense collection of data which is daily accumulating all over the world, to check the prevailing tendency of heaping up observations for no useful purpose. If this work shall have the effect of stimulating research, and promoting a more intelligent use of meteorological observations, it will do much good. It is to be hoped that it will be translated into English to reach a wider circle of readers.

RECENT PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Ottawa field-naturalists' club, Canada.

Jan. 31. — Mr. W. L. Scott read the report of the ornithological and oölogical branch, showing that a number of rare birds had been secured, that thirteen species had been added to the published lists, and that other good work had been done. Among specimens exhibited was a great white egret, in full breeding-plumage, which had been shot on the Upper Ottawa, — a locality far north of its usual range, but where it is stated to be a not uncommon visitor. Its

name, however, will not appear in the lists of the club, as the locality is considered beyond the limits of its district.

Prof. J. Macoun read a practical paper on the 'Edible and poisonous fungi' of the vicinity. He pointed out, that while at present the only fungus collected for food is the common mushroom, *Agaricus campestris*, there are other equally nutritious and palatable forms which exist in far greater abundance; as, for instance, *Coprinus comatus*, which grows in great profusion about the city during Sep-

tember. Two species of morel, *Morchella esculenta* and *Gyromitra esculenta*, are also common, and are very desirable food-supplies; while the Lycoperdons, or puff-balls, are found in immense numbers, and often of large dimensions, and, when young, are excellent for the table. Among poisonous forms, the fly-agaric, *Amanita muscaria*, was instanced as one of the most highly organized, most widely distributed, most beautiful, and most dangerous of the agarics. The difficulty of distinguishing by sight between many edible and non-edible or poisonous species was stated; and it was explained that those having a pleasant odor and taste were always likely to be eatable and harmless, while others would be more or less injurious. It is, however, always advisable, at first, to eat but a small quantity of any untried species. Professor Macoun, as botanist to the Geological survey, is now working at the fungi of Canada, and is preparing a report thereon for publication. Beautiful plates to illustrate this report have been drawn by Mrs. Chamberlin, a member of the club; and such as related to the forms discussed were exhibited by her, to the great gratification of the members. — The secretary laid on the table advance copies of the Transactions of the club for 1882-83, and announced that they would be ready for distribution in a few days.

Princeton science club.

Jan. 25. — Professor Rockwood gave a paper on the mutual relations of the conics, discussing especially the changes by which the different curves turn one into another through their limiting forms. He traced the various curves represented by the equation $A^2y^2 + B^2x^2 = A^2B^2$, when A^2 is constant, and B^2 assumes all possible values, showing them to include all the varieties of the ellipse and hyperbola. In the same way the equation $y^2 = \frac{2B^2}{A}x - \frac{B^2}{A^2}x^2$ was shown to include all forms of the conic when A and B assume various values, — zero, infinite, or finite. In tracing the movement of the foci, he showed that in the series of ellipses and hyperbolas the foci come first to coincide at the centre; afterward their distance from the centre becomes $c\sqrt{-1}$, which, by interpreting the imaginary factor as indicating revolution through a right angle, changes the foci from the horizontal to the vertical axis, on which they then recede to infinity, returning from infinity on the horizontal axis when the ellipses change through two parallels to the series of hyperbolas. The changes were also followed out with focus and directrix fixed and eccentricity varying, with focus and focal ordinate fixed and eccentricity varying, etc.

Professor Scott reported that he had just discovered a rudimentary pollex in *Oreodon* of the White River miocene. The carpus is very primitive in arrangement, and a trapezium is present.

New-York academy of sciences.

Jan. 21. — Two specimens of corundum from western North Carolina were exhibited by G. F. Kunz. One was a crystal weighing 13 grams: the other,

weighing $3\frac{1}{8}$ carats, was cut *en cabachon*, and by the exhibitor was said to be the most perfect star-sapphire probably yet found in the United States. Both pieces were a rich light-brown color, very compact, and resembled a variety of sapphire from the hills of precious stones in Siam. Prof. H. L. Fairchild delivered a lecture on methods of animal self-defence, which was well illustrated with a large series of well-selected lantern-slides. Remarks were made by President Newberry and Prof. W. P. Trowbridge.

Canadian institute, Toronto.

Jan. 19. — Prof. R. Ramsay Wright gave an account of researches on the skin and nervous system of *Amiurus catus*, which will shortly be published in the Proceedings. Special attention was devoted to the 'clavate' cells of the epidermis, to the branching of the fifth nerve, and to the relationship between the air-bladder and auditory organ.

Natural science association of Staten Island, New Brighton.

Jan. 12. — Mr. C. W. Leng read a paper on the Cicindelidae of Staten Island. The beetles live all summer in sunny places in the woods, roadsides, and on the sands at the seashore. They are able to make short flights, which they do at the least alarm, flying a few paces at a foot or two from the ground, and then dropping quite suddenly. Their colors always mimic the places at which they are found, which makes it difficult to distinguish them after they alight. During the night and rainy days they hide in holes dug in the sand, or among piles of chips and bark. The following eight species have been found on Staten Island: *C. sexguttata*, *purpurea*, *generosa*, *tranquebarica*, *repanda*, *hirticollis*, *dorsalis*, *punctulata*.

Remarks were made by Mr. Sechusen on a very interesting series of precious stones, their particular characters, and the localities from which they came.

Society of arts, Massachusetts institute of technology.

Jan. 10. — Dr. Charles S. Minot, of the Harvard medical school, read a paper giving an account of his researches on growth and death. Dr. Minot has undertaken an extensive series of experiments, which will occupy many years, on senescence, or the process of growing old; and he presented in this paper the results of one branch of his investigations, in which he had studied the growth of the guinea-pig from birth until the attainment of the full size, having made about fifty-five hundred weighings of these animals, the weight being the function of growth best adapted for study.

In 151 recorded births, the proportion of males to females was found to be 119 to 100. The average weight at birth was about 72.5 grams, and was about the same for males and females. The range was from 42 to 99 for the males, and 46 to 111 for the females. The most potent influence on the weight at birth was found to be the number in a litter; the larger the litter, the less the average weight. The period of gestation was found to average 67 days; and the longer the period, the greater the weight at birth.

This weight was also greater in summer than in winter. Notwithstanding the great variation of weight at birth, the difference diminished with age, all the animals thus tending to approach a certain standard size. One of the most important facts discovered was, that the rate of growth diminishes continuously from the time when the animal recovers from the loss of weight at birth; this diminution being rapid at first, and slower afterward. By rate is here meant, not the absolute increment in weight in a given period, but the per cent of the weight at the beginning of the period, which is added to said initial weight during the period. A discussion of the best available data indicates the result to be also true of man.

Dr. Minot had also made some experiments with rabbits, and compared the results with those for guinea-pigs and for man. He found that the guinea-pig grows on an average, until it is full-grown, 1.73 grams per diem, the rabbit 6.20, and man 6.60 grams. Men are therefore larger than rabbits, not because they grow faster, but because they grow longer; while rabbits are larger than guinea-pigs because they grow faster. The rate of growth, however, as above defined, is very different; being 4.6 % in the guinea-pig, 5 % in the rabbit, and 0.02 % in man.

Phi'sosophical society of Washington.

Jan. 5. — Prof. J. R. Eastman discussed the Rochester (Minn.) tornado of Aug. 21, 1883, describing the ground as it appeared a few days after the storm, and showing that the phenomena did not indicate cyclonic motion. All disturbed objects were thrown in essentially the same direction, and were pressed down rather than lifted. In the course of the ensuing discussion, Mr. W. H. Dall described

similar phenomena in the Escanaba region, where he observed storm-tracks consisting of swathes of prostrate trees, the trunks of which pointed uniformly in one direction.

Mr. Dall then read a paper on Recent advances in our knowledge of the limpets, summarizing the researches of Spengel on the sensory organs or osphradia; Cunningham, on the renal organ and renopericardial pore in Patella and Patina; Fraissé, on the eye in Patina, Fissurella, and Haliotis; and the speaker, on the presence of an intromittent male organ in Cocculina. He stated that among the Acmaeidae and Patellidae the type of eye differs; and while in Patina it is of a very rudimentary character, in other genera it might be well developed, — as, for instance, in Ancistromesus, which has as well developed eyes as Fissurella. He also alluded to the gradual progress in classification afforded by anatomical investigation during the past few years, and observed that nearly all the known forms except Propilidium and Scutellina were amenable to classification; our ignorance of the branchiae in the former, and the dentition in the latter, operating to prevent a final classification in these two cases until more is known. Those authors who study the embryology and histology usually from a single species generally ignore the wide differences of adult anatomy between the genera of limpets, and sow their generalizations on a basis of classification which is little in advance of that of Lamarck and his immediate successors.

The president of the society, Dr. James C. Welling, announced the death, since the last meeting, of Gen. A. A. Humphreys, one of the founders of the society, and pronounced a brief eulogy on his character.

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

Geological survey.

Geological notes. — Prof. I. C. Chamberlin and his assistants, during December, 1883, were engaged in field-work in Illinois and in Missouri. Professor Chamberlin devoted his personal attention mainly to the borders of the newer drift, the concentric morainic belts that lie within it, and the contiguous old drift without it, in north-eastern Illinois. Mr. R. R. Salisbury continued his previous observations of the residuary clays and loess and drift-borders in eastern and central Missouri.

The revision of the manuscript of a report by Mr. J. S. Curtis on the Eureka mines has been completed by Mr. G. F. Becker and Mr. Curtis, and will soon be ready for the printer.

Since the beginning of Prof. R. D. Irving's study of the metamorphic rocks in 1882, he and his assistants have made five hundred thin rock-sections. Of this number, written descriptions of three hundred have been prepared. They include rocks from the

original Huronian, the Huronian of the Marquette and Menominee regions, the Animikie group of the national boundary, the folded schists of the same region, and the crystalline rocks of the Minnesota and Mississippi valleys.

Assistant John Chaplin at Denver has prepared thin sections of all the eruptive rocks collected in the Rocky-mountain district during the past season.

Paleontology. — Prof. L. F. Ward has completed the work of preparing index slips for a catalogue of fossil plants. He has so arranged all of the fossil plants collected from the Laramie and Fort Union groups, that they are in a convenient form for future detailed investigation.

Chemical division. — The analyses of waters from Walker Lake and Walker River have been completed by Prof. F. W. Clarke.

Mr. J. W. McGee, in his examination of the subterranean forest exposed by an excavation on Connecticut Avenue, Washington, D.C. (referred to in *Science* of Nov. 30, 1883), discovered an earthy blue mineral, which was abundantly distributed throughout the